15. (New) The LCD of claim 1, wherein the pixel electrode is in electrical communication with a drain electrode (54) of the TFT through a contact hole (66) defined in the interlayer insulator, and wherein the reflective pixel electrode is located over and contacting the film comprising molybdenum nitride at least in areas spaced apart from said contact hole.

16. (New) The display of claim 7, wherein the reflective metal film is in electrical communication with a drain electrode (54) of a TFT through a contact hole (66) defined in the insulating film, and wherein the reflective metal film is located over and contacting the molybdenum nitride at least in areas spaced apart from said contact hole.

17. (New) The LCD of claim 11, wherein the pixel electrode is in electrical communication with a drain electrode (54) of the TFT through a contact hole (66) defined in the insulating layer, and wherein the pixel electrode is located over and contacting the film comprising molybdenum nitride at least in areas spaced apart from said contact hole.

REMARKS

This is in response to the Office Action dated April 22, 2003. An RCE and IDS have been filed herewith. New claims 15-17 have been added. Thus, claims 1-5 and 7-17 are now pending. Attached hereto is a marked-up version of the changes made to the

specification and claim(s) by the current amendment. The attached page(s) is captioned "Version With Markings To Show Changes Made."

For purposes of example, and without limitation, certain example embodiments of this invention relate to a technique for *improving adherence of a reflective pixel electrode in a liquid crystal display (LCD) to an underlying insulating layer.* As shown in Fig. 2A of the instant specification for example, the LCD includes a TFT 43, interlayer insulating film 44, molybdenum nitride (MoN) film 45 and conductive reflective pixel electrode 46 (e.g., made of Al) which defines at least part of a pixel of the LCD. The reflective pixel electrode 46 is in electrical communication with a drain 54 of the TFT via contact hole 66 defined in the interlayer insulating film 44. Surprisingly, it has been found that the use of MoN for layer 45 enables improved adhesion between the reflective pixel electrode 46 and interlayer insulator 44 thereby resulting in better yields. Unexpectedly, reduction of electrolytic corrosion is also achieved due to the MoN under the reflective LCD pixel electrode.

Objection Under 35 U.S.C. Section 132 (New Matter); & Section 112 re Same

Claims 7 and 11 stand objected to under 35 U.S.C. Section 132 as allegedly introducing new matter. This objection is respectfully traversed for at least the following reasons. For example, and without limitation, address lines 47 and 52 are illustrated in Fig. 1 of the instant application. See also the instant specification at page 11, lines 11-15. The recitation in the claims of address lines is clearly not new matter. Those skilled in the art commonly refer to data (S/D) and gate lines as address lines (e.g., see U.S. Patent Nos. 5,641,974; 5,994,721; 5,955,744 and 6,307,215). The Section 132 objection is

clearly incorrect and should be withdrawn. The Section 112, first paragraph, rejection is similarly flawed and must be withdrawn.

Claim 1

Claim 1 stand rejected under 35 U.S.C. Section 102(e) as being allegedly anticipated by Kurogane (US 5,831,281). This Section 102(e) rejection is respectfully traversed for at least the following reasons.

Claim 1 requires "a film comprising molybdenum nitride formed immediately below and in contact with the reflective pixel electrode, and above and contacting the interlayer insulator, so that the molybdenum nitride is at least partially located between and contacting each of the reflective pixel electrode and the interlayer insulator so that a bottom surface of the molybdenum nitride is located over and contacting a top surface of the interlayer insulator and a top surface of the molybdenum nitride is located under and contacting the reflective pixel electrode." For example, and without limitation, Fig. 2 of the instant application illustrates that the molybdenum nitride 45 is at least partially located between and contacting each of the reflective pixel electrode 46 and the interlayer insulator 44 so that a bottom surface of the molybdenum nitride 45 is located over and contacting the interlayer insulator 44 and a top surface of the molybdenum nitride 45 is located under and contacting the reflective pixel electrode 46. As explained above, it has surprisingly and unexpectedly been found that the use of MoN for layer 45 enables improved adhesion between the reflective pixel electrode 46 and interlayer insulator 44 thereby resulting in better yields; and also that reduction of electrolytic corrosion can be

achieved. The cited art fails to disclose or suggest the aforesaid underlined aspect of claim 1.

Kurogane discloses an address line 10 which includes both an MoN portion and an underlying Al portion. However, in direction contrast with claim 1, Kurogane fails to disclose or suggest that "a bottom surface of the molybdenum nitride is located over and contacting a top surface of the interlayer insulator and a top surface of the molybdenum nitride is located under and contacting the reflective pixel electrode" as required by claim 1. In particular, since the MoN of Kurogane is in an address line and thus entirely unrelated to the invention of claim 1, Kurogane's MoN 9 clearly does *not* have a bottom surface which contacts an upper surface of either layer 6 or layer 11. In contrast, the bottom surface of Kurogane's MoN 9 contacts only the upper surface of address line conductor 8 – thereby teaching directly away from the invention of claim 1. Kurogane is entirely unrelated to the invention of claim 1, and cannot possibly anticipate or render the same unpatentable.

Claim 15 (dependent on claim 1)

Claim 15 requires that "the pixel electrode is in electrical communication with a drain electrode (54) of the TFT through a contact hole (66) defined in the interlayer insulator, and wherein the reflective pixel electrode is located over and contacting the film comprising molybdenum nitride at least in areas spaced apart from said contact hole." E.g., see Fig. 2A of the instant application. Again, Kurogane is entirely unrelated to the invention of claim 15. The only place where Kurogane's MoN contacts the pixel

electrode is in the contact hole – thereby teaching directly away from the invention of claim 15.

Claim 7

Claim 7 requires "a laminated layer provided on at least one of the substrates, wherein the laminated layer comprises an insulating film and a film comprising molybdenum nitride laminated to and over at least part of the insulating film, so that the molybdenum nitride contacts an upper surface of the insulating film; and a reflective metal film having a light reflecting function and provided in at least one pixel region of the display for contributing to displaying of images in the display, wherein the reflective metal film is formed on the laminated layer so as to contact the molybdenum nitride."

Again, Kurogane's MoN 9 does not contact the upper surface of either layer 6 or layer 11. The MoN 9 of Kurogane contacts the upper surface of only conductive Al layer 8 thereby teaching directly away from claim 7. Kurogane also cannot be combined with Mitsui under Section 103 to meet this claim. Any alleged combination would merely result in Mitsui using Kurogane's address line, which would not meet the invention of claim 7 for the reasons discussed above.

Claim 11

Claim 11 call for "a film comprising molybdenum in direct contact with the under-side of said reflective pixel electrode, so that the molybdenum is in directly contact with the under-side of the reflective pixel electrode and an upper surface of the insulating layer between which the molybdenum is directly sandwiched." Again, Kurogane's MoN 9 does not contact the upper surface of either layer 6 or layer 11. The MoN 9 of Kurogane

contacts the upper surface of only conductive Al layer 8 thereby teaching directly away from claim 11. Kurogane also cannot be combined with Mitsui under Section 103 to meet this claim. Citation to Mitsui cannot overcome the aforesaid flaws of Kurogane.

Claim 12

Claim 12 requires that "the molybdenum nitride is located between and contacting each of the insulating layer and the conductive electrode layer, such that the molybdenum nitride is located below the conductive electrode layer and above the insulating layer so that the insulating layer is between the substrate and the molybdenum nitride, so that a bottom surface of the molybdenum nitride is located over and contacting a top surface of the insulating layer and a top surface of the molybdenum nitride is located under and contacting the conductive electrode." Again, the cited art fails to disclose or suggest this aspect of claim 12.

Claims 16-17

Claims 16-17 require that the reflective metal film or pixel electrode is located over and contacting the molybdenum nitride at least in areas spaced apart from the contact hole (e.g., see Fig. 2A of the instant application). Kurogane is entirely unrelated to the inventions of these claims. The only place where Kurogane's MoN contacts the pixel electrode is in the contact hole – thereby teaching directly away from these claims.

Conclusion

For at least the foregoing reasons, it is respectfully requested that all rejections be withdrawn. All claims are in condition for allowance. If any minor matter remains to be resolved, the Examiner is invited to telephone the undersigned with regard to the same.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

1. (Amended) A liquid crystal display (LCD) comprising:

at least one thin film transistor (TFT), an interlayer insulator, and at least one reflective pixel electrode defining at least part of a pixel of the LCD and being supported by a substrate, wherein the interlayer insulator is located at least partially between the reflective pixel electrode and the substrate, and

a film comprising molybdenum nitride formed immediately below and in contact with the reflective pixel electrode, and above and contacting the interlayer insulator, so that the [film comprising]molybdenum nitride is at least partially located between and contacting each of the reflective pixel electrode and the interlayer insulator so that a bottom surface of the molybdenum nitride is located over and contacting a top surface of the interlayer insulator and a top surface of the molybdenum nitride is located under and contacting the reflective pixel electrode.

7. (Amended) A liquid crystal display comprising:

a pair of substrates,

a liquid crystal layer between the pair of substrates,

a laminated layer provided on at least one of the substrates, wherein the laminated layer comprises an insulating film and a film comprising molybdenum nitride laminated

to and over at least part of the insulating film, so that the [film comprising]molybdenum nitride contacts an upper surface of the insulating film[,

wherein the insulating layer is located at least partially over address lines of the liquid crystal display]; and

a reflective metal film having a light reflecting function and provided in at least one pixel region of the display for contributing to displaying of images in the display, wherein the reflective metal film is formed on the laminated layer so as to contact the [film comprising]molybdenum nitride.

11. (Amended) A liquid crystal display (LCD) comprising:

at least one thin film transistor (TFT),

an insulating layer at least partially provided over the TFT, and wherein address lines of the LCD[, at least some of said address lines being] are in communication with the TFT;

at least one reflective pixel electrode defining at least part of a pixel of the LCD; and

a film comprising molybdenum in direct contact with the under-side of said reflective pixel electrode, so that the [film comprising]molybdenum is in directly contact with the under-side of the reflective pixel electrode and an upper surface of the insulating layer between which the molybdenum is directly sandwiched.

12. (Amended) An electronic device comprising:

a substrate supporting an insulating layer and a conductive electrode layer; and

a layer comprising molybdenum nitride, wherein the molybdenum nitride is located between and contacting each of the insulating layer and the conductive electrode layer, [wherein]such that the [layer comprising]molybdenum nitride is located below the conductive electrode layer and above the insulating layer so that the insulating layer is between the substrate and the [layer comprising]molybdenum nitride, so that a bottom surface of the molybdenum nitride is located over and contacting a top surface of the insulating layer and a top surface of the molybdenum nitride is located under and contacting the conductive electrode.

Please add the following new claims:

15. (New) The LCD of claim 1, wherein the pixel electrode is in electrical communication with a drain electrode (54) of the TFT through a contact hole (66) defined in the interlayer insulator, and wherein the reflective pixel electrode is located over and contacting the film comprising molybdenum nitride at least in areas spaced apart from said contact hole.

16. (New) The display of claim 7, wherein the reflective metal film is in electrical communication with a drain electrode (54) of a TFT through a contact hole (66) defined in the insulating film, and wherein the reflective metal film is located over and contacting the molybdenum nitride at least in areas spaced apart from said contact hole.

17. (New) The LCD of claim 11, wherein the pixel electrode is in electrical communication with a drain electrode (54) of the TFT through a contact hole (66) defined in the insulating layer, and wherein the pixel electrode is located over and contacting the film comprising molybdenum nitride at least in areas spaced apart from said contact hole.